BLACK BOX®
NETWORK SERVICES

InvisaPC™ DTX1000 System User Guide

Installation and User Manual

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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Safety and EMC Approvals and Markings

FCC and CE Safety certifications and EMC certifications for this product are obtained under one or more of the following designations: CMN (Certification Model Number), MPN (Manufacturer's Part Number) or Sales Level Model designation. The designation that is referenced in the EMC and/or safety reports and certificates are printed on the label applied to this product. European Union Notification Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Patent Information

This product contains patented designs and is protected by U.S. and international patents and patents pending.

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Technical Specifications

Approvals	Unit: FCC, CE, RoHS2; Power Supply: FCC, CE, RoHS2, TUV, UL®
DDC Support	**DTX1000-T (Transmitter): I**nternal DDC table

Default Settings	**DTX1000-T (Transmitter):**
	    IP Address: 192.168.1.22;
	DTX1000-R (Receiver):
	    IP Address: 192.168.1.21;
	    Username: admin;
	    Password: N/A, blank password by default

Distance	**DTX1000-T (Transmitter):**
	    Distance (maximum) from CPU to TX: 16 feet, DVI-D and USB limitations;
	    Distance (maximum) between TX and RX: 328 feet (100 m), use a network switch to get further
	        distances

Encryption	Secure Sockets Layer (SSL) over a TCP/IP up to 128-bit for transmitter to receiver with virtualized targets, dependent on configuration
Environmental	Temperature: Operating: 32°F to 104°F (0°C to 40°C); Humidity: 80%, noncondensing
Heat Dissipation (BTU/hr.), Maximum	**DTX1000-R (Receiver):** (5VDC x 4Amps) * 3.41 = 68.2 BTU/h MAX (Voltage x Nominal Current) * 3.41 = BTU/H
Hotkey Support	PrtScrn (default)
Operating Systems Supported	Microsoft Windows Vista, XP, Windows 7, Windows 8, Server 2003, Server 2008, Server 2012, Linux, Solaris, Mac OS

Connectors	**DTX1000-T (Transmitter):**
	    (1) DVI-I female (digital only) input,
	    (1) Mini USB Type B female input (USB 2.0 compliant),
	    (1) 2.5-mm DC jack for power,
	    (1) RJ-45 female network port;
	DTX1000-R (Receiver):
	    (1) DVI-I female (digital only) output,
	    (4) USB Type A female,
	    (1) RJ-45 network,
	    (2) 3.5-mm MIC/Stereo,
	    (1) 2.5-mm barrel for power

Power	Input: 100-240 VAC, 50/60 Hz, 0.9 Amps max., external in-line power supply; Input connector type: IEC320, C8; Output: 5 VDC, 4 Amps max., 20 Watts; Output connector: 2.5-mm barrel Power supply cord length: 6 feet (1.8 m)
Dimensions	Each unit (TX or RX): 1.38"H x 6.44"W x 4.31"D (3.5 x 16.35 x 10.94 cm)
Weight	Each unit (TX or RX): 0.848 lb. (0.38 kg)

Instructions

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Dangerous Voltage

This symbol is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Power On

This symbol indicates the principal on/off switch is in the on position.

Power Off

This symbol indicates the principal on/off switch is in the off position.

Protective Grounding Terminal

This symbol indicates a terminal which must be connected to earth ground prior to making any other connections to the equipment.

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Chapter 1 – Product Overview

Introduction

The InvisaPC system, which includes a transmitter and a receiver, provides users with a full desktop experience from anywhere on the corporate TCP/IP network, while maintaining the desktop securely housed in a corporate data center. The desktops accessed can be a physical PC / workstation or can be a virtual desktop hosted on a server.

Desktop users can access keyboard, mouse, video, audio, USB mass storage devices, and other USB devices from the remote PC/workstations or Virtual Desktop via the InvisaPC system.

NOTE: References to the InvisaPC system in this document refer to both the receiver (DTX1000-R) and the transmitter (DTX1000-T).

NOTE: Release 1 will not support USB 2.0, mass storage, audio, or share mode.

InvisaPC system features

The InvisaPC system offers the following features.

Security

The InvisaPC system supports Secure Sockets Layer (SSL up to 128-bit when a transmitter and receiver are connected to each other) over a TCP/IP connection. All media streams transmitted between the InvisaPC Receiver and the Transmitter are encrypted. Password protection is also provided to control access to all administration functions.

Flash upgradable

Upgrade your firmware at any time using a USB flash-drive in an InvisaPC Receiver unit to ensure that your InvisaPC system is always running the most current version available. Both the InvisaPC Transmitter and the Receiver are Flash upgradable.

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IP addressing

The InvisaPC Receiver and Transmitter are IP-addressable devices, giving you the flexibility to locate workstations anywhere within your enterprise and at any distance from your desktop users. The InvisaPC receiver and transmitter use standard network protocols to transfer data between the remote workstation and the peripheral devices located at the user's desk. The InvisaPC Receiver and Transmitter can operate on a network connection of 100 Mbps or better.

Support for keyboards, mice and mass storage devices

USB keyboards and mice are fully supported by the InvisaPC system. The remote workstation default keyboard and mouse drivers are fully supported, enabling the InvisaPC system to support two, three and five-button mice with scroll and tilt-wheel capability. Composite mouse and keyboard devices are also supported, along with mass storage devices and other types of USB devices. CD and DVD/ROM drives, thumb drives, printers, pen tablets, and isochronous USB devices such as headsets and webcams are supported.

Support for non-keyboard and mice *USB re-direction* (also called virtual USB) is provided automatically on the InvisaPC Receiver, but can be overridden by the admin. In an InvisaPC Receiver, the first three devices that are not keyboard or mouse are assigned to the virtual USB channel (vUSB channel or USB re-direction) and passed to the remote computer. When connecting to a non-Transmitter target (i.e. remote FX virtual desktop), USB is supported for common USB devices.

NOTE: Release 1 will not support USB redirection or mass storage devices.

NOTE: A hub can be attached externally to the InvisaPC Receiver, but a maximum of three devices can be assigned to vUSB or USB re-direction. Multiple keyboard and mice can additionally be supported – though all use the default drivers.

The InvisaPC transmitter provides a single physical USB interface by providing an integrated hub within the transmitter.

Video

The InvisaPC system supports Video of 24-bit color depth up to a maximum resolution of 1920 x 1200 at 60 Hz on both transmitter and receiver. A DVI-I connector is provided on both Receiver and Transmitter, but only digital video is supported. The system supports DDC version 2B.

DDC2B is a bidirectional serial communication between a computer graphics interface and display device. This standard describes and compares each display control interface.

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The InvisaPC supports the resolutions listed below:

• 640 x 480 @ 60 Hz
• 800 x 600 @ 60 Hz
• 1024 x 768 @ 60 Hz
• 1600 x 1200 @ 60 Hz
• 1280 x 1024 @ 60 Hz
• 1280 x 960 @ 60 Hz
• 1280 x 800 @ 60 Hz
• 1440 x 900 @ 60 Hz
• 1680 x 1050 @ 60 Hz
• 1400 x 1050 @ 60 Hz
• 1280 x 720 @ 60 Hz
• 1920 x 1200 @ 60 Hz
• 1920 x 1080 @ 60 Hz

NOTE: These resolutions are supported at the time of writing this manual.

Transmitter features

The transmitter connects externally to the DVI port and a USB port of the remote workstation. The InvisaPC transmitter is attached directly to the remote workstation and is powered by an external Power-Supply Unit (PSU).

The transmitter captures, compresses, and encrypts the workstation's media streams and transmits them to the Receiver over a standard TCP/IP network.

Multiplatform support

The Transmitter is connected to the remote workstation via USB and DVI connectors. This enables the InvisaPC Receiver to interoperate seamlessly with PC, Oracle/Sun® and Macintosh® workstation.

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Receiver features

The InvisaPC Receiver enables the desktop user's peripherals to connect to the target workstation or virtual desktop via a network connection to the Transmitter connected to the target workstation or to the server hosting the virtual desktop.

Multiplatform support

InvisaPC is compatible with the following operating systems:

- ∞ Microsoft® Windows® Vista, XP, Windows 7, Windows 8, Server 2003, Server 2008, Server 2012
- ∞ Linux®
- ∞ Solaris™
- ∞ Mac OS®

The default keyboard drivers for these operating systems are supported by the InvisaPC system.

NOTE: For virtual desktops, typically Pro or Enterprise versions of the Windows operating system are required for VDI. See www.microsoft.com for Terminal Services (RDSH) or VDI (RDVH) requirements.

Flexible installation

The InvisaPC Receiver provides you with the following flexible installation features:

- ∞ Installation doesn't require new drivers or software.
- ∞ Standard UTP cabling makes installation simple and keeps costs low.

On-Screen Display (OSD)

The InvisaPC Receiver includes an On-Screen Display (OSD) that allows you to view information about the configuration of your system and manage the configuration when logged in as admin.

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Operations, administration, and maintenance

The InvisaPC Receiver's OSD allows you to perform administration and maintenance tasks for both the InvisaPC Receiver and Transmitter. Examples of tasks you can perform include creation of user access rights, configuration of network settings, and firmware Flash upgrades.

Virtual USB (USB re-direction)

USB devices can be attached to the InvisaPC Receiver and function as if they are directly connected to the remote workstation or virtual desktop. This is called virtual USB and this term will refer to both operation with a transmitter or virtual desktop. This is often referred to as USB re-direction in virtual desktop systems.

USB devices can be hot-plugged.

NOTE: In Release 1, virtual USB/USB redirection is not supported.

Audio

The InvisaPC system supports CD-quality stereo audio from the remote workstation (with the Transmitter connected) or virtual desktop to peripheral speakers connected to the line-out connector on the InvisaPC receiver. The InvisaPC Transmitter uses USB to capture audio from the remote workstation (hence no need for a separate audio cable at the transmitter).

The InvisaPC Receiver supports mono-quality audio from a peripheral microphone connected via Microphone-In connector on the receiver to the remote workstation (with a Transmitter connected) or a virtual desktop. The InvisaPC Transmitter uses USB to supply the microphone data to the remote workstation (hence no need for a separate audio cable at transmitter).

NOTE: In Release 1, audio and microphone are not supported.

Receiver modes

The InvisaPC system can operate in Auto-Login Mode, Auto-Connect Mode, Matrix Mode, or Share Mode. The InvisaPC receiver and transmitter can obtain their IP address data from a DHCP server in any of the three modes.

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Auto-Login

In Auto-Login Mode, turning on the InvisaPC Receiver automatically causes it to login as a pre-defined user. The user is presented with the available connections that can be made to remote workstations/virtual desktops.

Auto-Connect

In Auto-Connect Mode, when a user logs-in to the InvisaPC Receiver, it causes an automatic connection to their allocated workstation or virtual desktop (this connection is pre-defined and triggered by a successful login).

Private Connection

In Private Mode, when a user makes a connection to a target workstation/virtual desktop, this connection is only accessible by this user. All other users will receive a "busy" message if they attempt to connect to the same workstation/virtual machine. This is the default mode for connections.

NOTE: In Release 1, private connections are not supported, but will not affect anything because sharing is not supported.

Share Mode

In Share Mode, multiple users can connect to the audio and video of a target computer over the network and arbitrate for control of the keyboard and mouse of that computer. Non-keyboard and mice devices are not supported on shared connections.

NOTE: Share mode is not supported on V1.x version of InvisaPC firmware.

These various modes can be mixed on a particular Receiver and connection. For example Auto-Login and Auto-Connect can be combined to enable an InvisaPC receiver to automatically connect to a specific target workstation/virtual desktop when power is applied without any user-intervention that might be required for Digital Signage type of deployments.

In Figure 1, a typical deployment is shown in what to is called *basic extender*. In this deployment, only one Transmitter and Receiver are used to allow remote access to a single workstation.

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Figure 1 - InvisaPC System (basic extender)

Table 1.1: Figure 1 Descriptions

Number	Description
1	PC or Workstation
2	InvisaPC Transmitter
3	IP network – 100Mbps
4	InvisaPC Receiver
5	User Peripherals – keyboard, mouse, monitor

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In Figure 2, a larger scale system is shown. This is referred to as an *unmanaged matrix* type of deployment. In this deployment, there are several Receivers and Transmitter as well as virtual desktops.
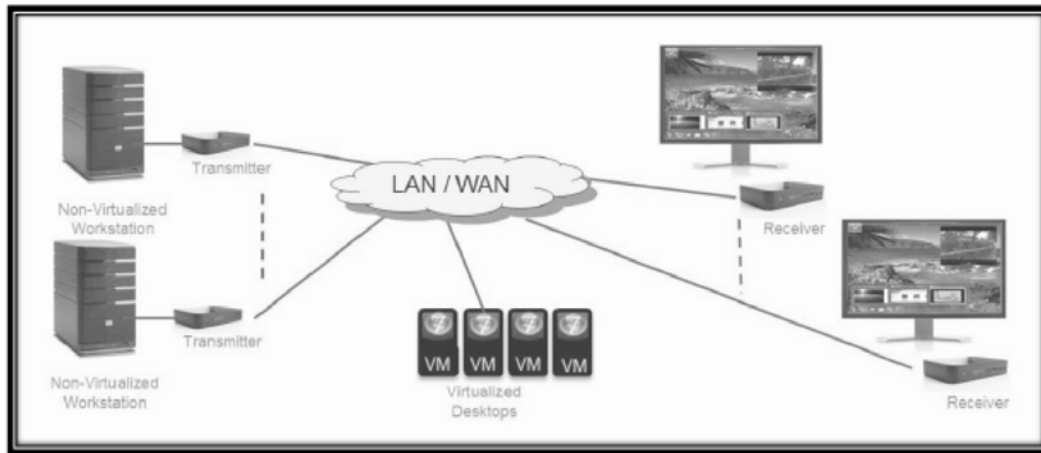

Figure 2 - InvisaPC Systems (Unmanaged Matrix)

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Safety Precautions

To avoid potentially fatal shock hazard and possible damage to equipment, please observe the following precautions:

∞   Test AC outlets at the workstation and monitor for proper polarity and grounding.
∞   Use only with grounded outlets at both the workstation and monitor. When using a backup Uninterruptible Power Supply (UPS), power the workstation and the transmitter from the same supply.

NOTE: The AC inlet is the main disconnect.

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Chapter 2 - Installation

Installing the InvisaPC Receiver

Before installing your InvisaPC Receiver, refer to the list below to ensure that you have all the items necessary for installation.

Requirements to install the InvisaPC Receiver

1. InvisaPC Receiver
2. External power supply for the InvisaPC Receiver
3. IEC power cord
4. InvisaPC Quick Installation Guide (QIG)

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Mounting option

The InvisaPC Receiver mounts to the rear of a flat panel monitor via a mounting plate accessory.

Installing the InvisaPC Transmitter

Before installing your InvisaPC Transmitter, refer to the list below to ensure that you have all the items necessary for installation.

Requirements to install the InvisaPC Transmitter

1. InvisaPC Transmitter
2. External power supply for the InvisaPC Receiver
3. IEC power cord
4. DVI cable (provided with unit)
5. USB cable (provided with unit)
6. InvisaPC Quick Installation Guide (QIG)

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Installation options

> ⚠️ **CAUTION:** To reduce the risk of electric shock or damage to your equipment, disconnect the power from the InvisaPC Receiver or Transmitter by unplugging the power supply from the electrical outlet. To reduce the risk of electric shock or damage to your equipment, turn on the remote workstation and the InvisaPC Transmitter in the order described in the following procedures.

You can install the InvisaPC system with the InvisaPC Receiver either on a point-to-point or networked configuration.

Point-to-point installation

In a point-to-point configuration, no administrator setup of the InvisaPC Transmitter or the InvisaPC Receiver is required. This enables you to install the system quickly, directly out-of-the-box. However, in the point-to-point configuration, you can install only one InvisaPC Transmitter and InvisaPC Receiver pair on a subnet, and both must be on the same subnet unless a router is present in the network to span subnets.
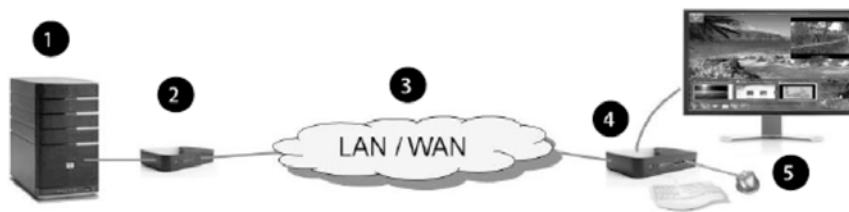

Figure 3 - Point-to-point installation

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Table 2.1: Figure 3 Descriptions

Number	Description
1	PC or Workstation
2	InvisaPC Transmitter
3	IP network – 100Mbps
4	InvisaPC Receiver
5	User Peripherals – keyboard, mouse, monitor

To connect the InvisaPC Transmitter:

Before connecting the InvisaPC Transmitter to the remote workstation, ensure that the resolution and the refresh rate of the remote workstation are supported by the InvisaPC Transmitter. Set the screen resolution and refresh rate of the remote workstation. Unsupported settings will cause blank video or distorted video at the Receiver.

1. Turn off the remote workstation.

2. The InvisaPC Transmitter has one USB connector. Connect it to a corresponding USB port on the remote workstation (a USB 2.0 port on remote workstation for best performance). Connect using the provided USB cable.

3. Connect the video connector on the InvisaPC Transmitter to the appropriately labeled port on the workstation using the provided DVI cable.

4. Connect one end of the UTP cable to the InvisaPC Transmitter's RJ-45 connector and turn on the workstation.

5. Route the other end of the UTP cable to the location you have chosen for the InvisaPC Receiver. If necessary, you can extend the UTP cable via junctions or an Ethernet switch (subject to normal Ethernet cabling practices).

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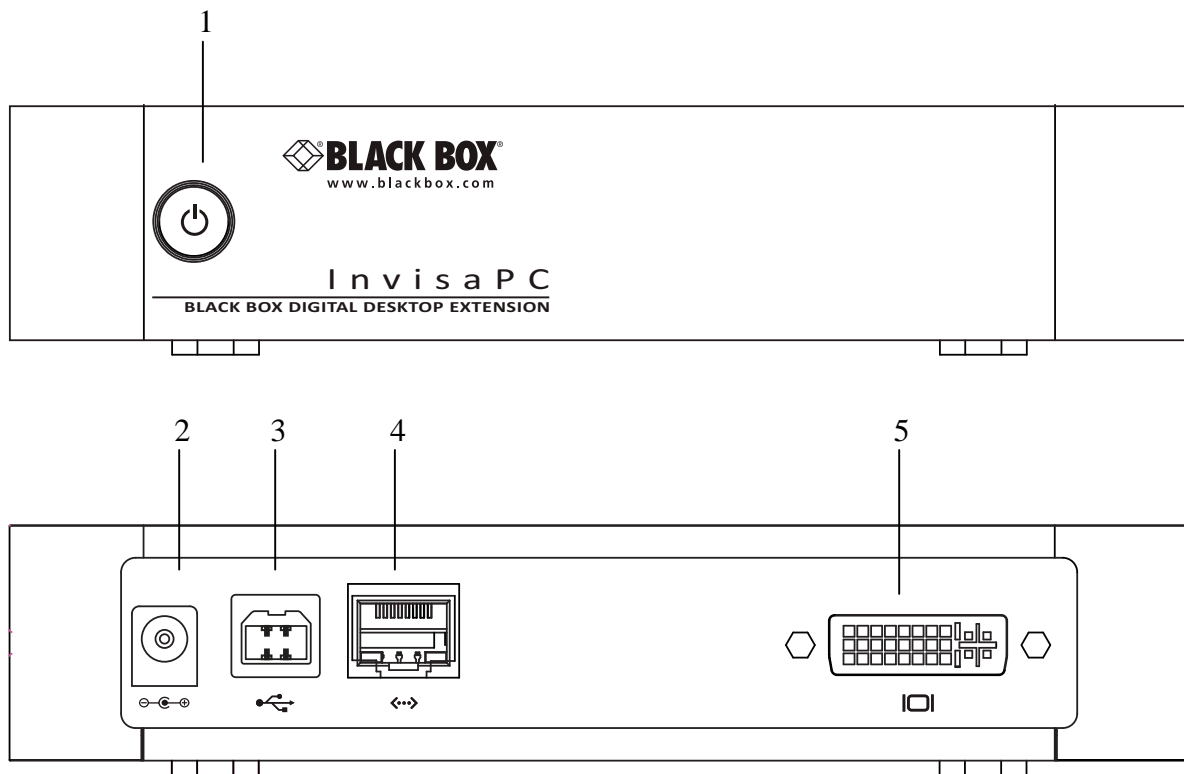
Figure 4 - InvisaPC Transmitter Connections

Table 2.2: Figure 4 Descriptions

Number	Type of Connector
1	Power LED
2	5V DC Power Inlet
3	USB Type B Connector
4	RJ-45 Port
5	DVI Video

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To connect the InvisaPC Receiver:

1. Connect your keyboard, monitor, mouse, and other peripheral cables to the appropriately labeled ports on the the InvisaPC Receiver.

2. Connect the UTP cable to the RJ-45 port on the back of the InvisaPC Receiver.

3. Turn on the InvisaPC Receiver. A default connection is available to allow connection to a default InvisaPC Transmitter. You can use the OSD to add a different connection to a remote Transmitter or virtual desktop (see page 35 for details on how to add a connection). The default Transmitter IP address is 192.168.1.22.

4. Once a Connection has been defined, use the OSD to make connection.

NOTE: VGA monitors can be connected to the InvisaPC Receiver by using a DVI-D to VGA converter (not adaptor), such as the AC1038A.
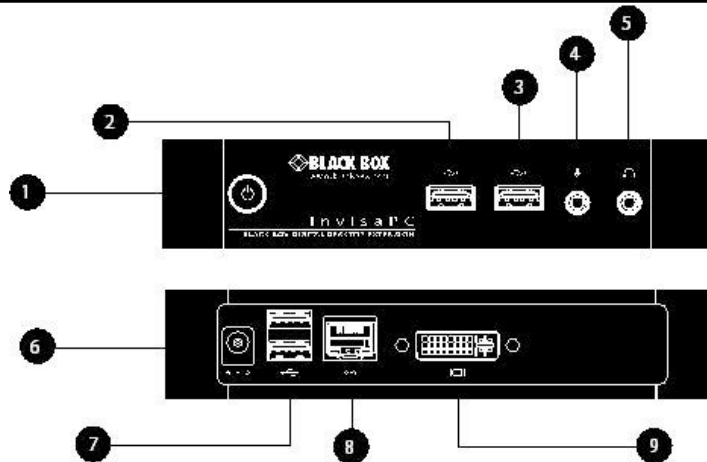

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Table 2.3: Figure 5 Descriptions

Number	Type of Connector
1	On/Off Button
2	USB Type A Connector
3	USB Type A Connector
4	Microphone
5	Audio Line Out
6	5V DC Power In
7	Dual USB Tupe A Connector
8	RJ-45 Port
9	DVI Video

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Connecting power

The InvisaPC Receiver features an external power supply. A DC power jack is located on the rear of the InvisaPC Receiver.

NOTE: Use only the power supply provided by Black Box.

To connect power to the InvisaPC Receiver:

1. Plug the external power supply's 2.5 mm connector into the DC power jack on the rear of the InvisaPC Receiver.
2. Connect the detachable IEC power cord to the power supply.
3. Plug the IEC power cord into an appropriate wall outlet.

Networked installation

The following instructions will enable you to install your InvisaPC Receiver and InvisaPC Transmitter in a networked configuration. In this installation, multiple InvisaPC Transmitters and InvisaPC Receivers are attached via the same Ethernet network. In this case, it is important for each unit to be configured with a unique IP address.

InvisaPC Transmitters and InvisaPC Receivers may be configured for use on a single subnet or for use across routers. Use of routers, however, can cause a slight increase in end-to-end latencies, which may not be acceptable for all applications.

NOTE: When using the InvisaPC across the Internet, the receiver's IP address will need to have Port 3389 forwarded using the router's "Port Forwarding."
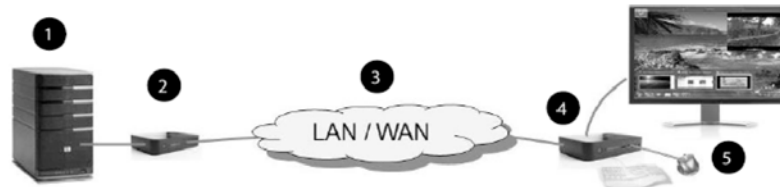
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Figure 6 - Point-to-point installation

Figure 2.4: Networked Installation

Number	Description
1	PC or Workstation
2	InvisaPC Transmitter
3	IP network – 100Mbps
4	InvisaPC Receiver
5	User Peripherals – keyboard, mouse, monitor

The InvisaPC Receiver has been preconfigured with factory-default network settings. If you install only one InvisaPC Receiver and one InvisaPC Transmitter on a subnet, you do not need to change these default network settings. If you install multiple units on the same subnet, you will need to assign a unique IP address to each unit or configure the receiver for DHCP. This can be done via the On-Screen Display (OSD) on the InvisaPC Receiver and must be carried out before adding multiple devices on the same network. See Chapter 3 - Operations for more information.

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Table 2.5: InvisaPC System Default Network Settings

Component	IP Address	Type	Default Gateway	Subnet Mask
InvisaPC Receiver	192.168.1.21	Static	0.0.0.0	255.255.255.0
InvisaPC Transmitter	192.168.1.22	Static	0.0.0.0	255.255.255.0

To install the InvisaPC system on a network:

1. With the InvisaPC Transmitter already connected to the remote workstation, connect it to the network via the unit's RJ-45 connector.

2. Connect the InvisaPC Receiver to the peripherals. Use UTP cable to connect the InvisaPC Receiver to the Ethernet network via the RJ-45 connector on the rear of the InvisaPC Receiver.

3. Turn on the InvisaPC Receiver. A default connection is available to allow connection to a default InvisaPC Transmitter. You can use the OSD to add different connections to remote Transmitters or virtual desktops (see Chapter 3 - Operations for details on how to add a connection). The default Transmitter IP address is 192.168.1.22

4. Use the OSD on the InvisaPC Receiver to reconfigure the network settings for the InvisaPC transmitter.

NOTE: If the InvisaPC Receiver and Transmitter are to be located on different subnets, configure their network settings before you connect to the network.

NOTE: If there are already InvisaPC Receiver and Transmitter pairs operating on the subnet, configure network settings of new InvisaPC Transmitter and Receiver pairs before connecting them to the network.

5. Repeat this procedure for each InvisaPC Transmitter and Receiver pair you wish to install on the network.

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Chapter 3 - Operations

Overview

Operating a workstation or virtual desktop through the InvisaPC system is no different than working directly connected to a PC desktop. All peripherals operate as if directly connected, even though the workstation/virtual desktop is located at a distance.

While the InvisaPC system default settings will work in most environments, you may configure the settings to better fit your installation via the On-Screen Display (OSD) on an InvisaPC Receiver. You can also upgrade the InvisaPC system. See *Upgrading your InvisaPC System* on page 45 for more information.

LED identification

Front panel

There is one LED on the front panel of an InvisaPC unit – integrated into the power-button on the Receiver - called the *STATUS LED*. The STATUS LED will light up when the unit (Receiver or Transmitter) is turned on. The *STATUS LED "blinks"* when a unit is being upgraded.

Rear panel

Two LEDs are built into the RJ-45 connectors on the InvisaPC Receiver and Transmitter. The definition of the operation of these LEDs is shown in table 3.1.

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Table 3.1: RJ-45 Connector LEDs

LED	Indication	Meaning
LED 1	Green on	Linked at 100 Mbps
	Green off	Linked at 10Mbps or No Link
LED 2	Yellow Static	Linked but no activity
	Yellow flashing	Transmit/receive activity

Accessing the System

A connection is established using the OSD on an InvisaPC Receiver. Once you are connected, a series of messages will be displayed on the screen to inform you of the progress of the connection. You will be able to interact with the remote workstation or virtual desktop as if it were located at your desk.

NOTE: If the remote workstation or server hosting virtual desktop has been turned off, the InvisaPC user station cannot establish a connection.

OSD functions

The InvisaPC Receiver incorporates an On-Screen Display (OSD) that allows you to view information about the configuration of your system and potentially also allows for setting connections and configuration parameters such as the IP address depending on the type of user.

User Types

The InvisaPC system defines three classes of users:

1. *Administrator* – users of this class have full rights to configure the system. They can create/modify/delete new users and connections, change network settings, etc.
2. *Power-User* – users of this class can configure the resolution of the connection for virtual desktop connections and to make connections.
3. *Standard User* – users of this class can only select from a list of pre-defined connections to access and view system information. They cannot change any configuration settings.

Log-on

A user must log-on to the InvisaPC Receiver to configure and manage the InvisaPC system. The log-on screen is shown in Figure 7. The username defines the access rights and configuration available to the user.
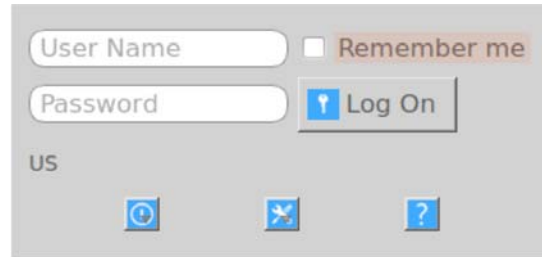
Figure 7 - InvisaPC Receiver OSD - Login-on screen

The fields on this screen are:

∞**Username**: the username to log-on as defined by the Admin.
∞**Password**:   password for the user.
∞**Remember Me**: When this box is checked the unit keeps the username between log-ons and power-cycles. When this box is not checked the username field is always presented as blank when powered-up and after a log-out. This tick-box only affects the username – the password is never preserved.
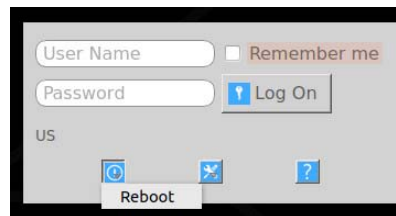
Figure 8 - Logon screen – Reboot button

∞ **System Preferences:** This button has a drop down menu that allows the user to define system preferences for the InvisaPC Receiver. Figure 9 shows how the keyboard type can be selected.
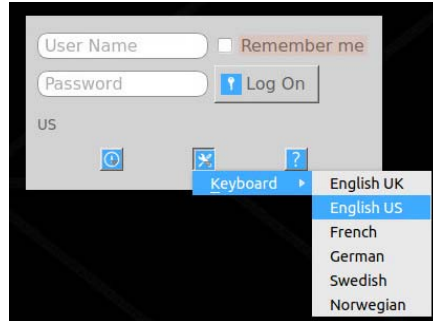
Figure 9 - Setting System Keyboard type

∞ **Help**: This button opens a pop-up window with help on that screen.

Default Username and Password

The InvisaPC Receiver ships with a default username of Admin with a blank password (i.e. no password). This user cannot be deleted but the password can be changed.

Connections Screen

When a user successfully logs-on to the InvisaPC Receiver, the Connection screen is displayed. This is shown in Figure 10. The connections that a user can make are listed in the connection window (Examples "connection1", "connection2" and "connection3" are shown in Figure 10). The user logged on is shown in the top right corner of the OSD – in the example connection screen shown in Figure 10, the user "admin" is logged on.

The keyboard country type is shown at the bottom left corner of the screen beside the power button. In Figure 10 this is displayed as "US" indicating that the US Country type has been defined for the keyboard.
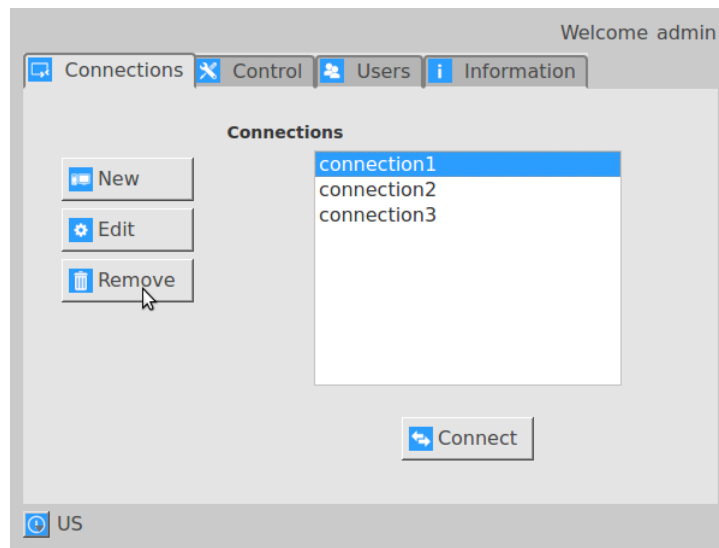
Figure 10 - Connections Screen

If the user is an *Administrator,* type the three buttons on the left (New, Edit and Remove) will be displayed. These allow the user to create, edit, or remove connections. For *Power-User* and *User* types, no connections can be created, edited, or removed so these buttons are not displayed.

By default there is one connection called "*Default Tx - 192.168.1.22*", which defines a connection to an InvisaPC Transmitter with its factory defaults. A maximum of 32 connections can be defined for an InvisaPC Receiver and these connections can be shared by users as defined by an administrator (different users can have the same connection).

Creating a New Connection

To allow an InvisaPC Receiver to connect to a target – whether Virtual Desktop or an InvisaPC Transmitter – an administrator must create a connection. The administrator clicks on the *N*ew button on the Connections screen. This causes the New Connections pop-up window to appear as shown in Figure 11.

Figure 11 - New Connection Pop-up Window

The fields on this screen are:

∞**Name**: this is a unique name for the new connection. The name can be between 1 and 32 characters. The name can be composed of any Alphanumeric characters and special characters except for   " " / \ [ ] : ; | = , + * ? < > `'
∞**IP Address**:   the IP address of the InvisaPC transmitter or the Virtual Desktop in IP v4 format.

∞**Port**:   the TCP port number to be used to establish connection to the InvisaPC transmitter or the Virtual Desktop. The default is 3389. A user can change this field if required to match their network/firewall requirements.

∞**Username**:   defines the username to be used to log-on to a virtual desktop. It is not used when connecting to an InvisaPC Transmitter. Username *can* be left blank for a *InvisaPC Transmitter* connection. The maximum length of the username is 32 characters. The username can be any valid username for a Microsoft O/S. This means the username cannot contain " "/ \ [ ] : ; | = , + * ? < > `'

∞**Password**:   defines the password to be used to log-on to a virtual desktop. It is not used when connecting to an InvisaPC Transmitter and *can* be left blank for a *InvisaPC Transmitter* connection. The maximum length of the password is 32 characters. The password can be any valid password for a Microsoft O/S. This means the password cannot contain the following characters " " ` '

∞**Connect via Transmitter**: this needs to be set to connect to an InvisaPC Transmitter. This needs to be clear when connecting to a virtual desktop.

∞**Enable USB Redirection**: when set this enables non-keyboard and non-mice devices to be redirected for this connection.

∞**Enable Audio**: when set this enables audio to be supplied to the remote audio connectors (i.e. analog audio).

∞**Enable Extended Desktop**: not available on the single-video head InvisaPC transmitter. On a dual-video head InvisaPC, this enables both video heads to operate if connected to a source that supports dual-head operation (eg. Dual-head InvisaPC Transmitter or Virtual Desktops with 2 video heads enabled).

Connecting

To make a connection, the user highlights the required "connection" in the window and then clicks on the " Connect" button. Alternatively, a user can double click on the connection. This action causes the InvisaPC Receiver to attempt to connect to the target remote workstation / virtual desktop. If the target is available the connection will be made.

If another user is already connected to the target defined in the connection, the user will receive a pop-up window indicating the target device already allocated and name of the user currently connected. For virtual desktop targets, this operation will vary with server configuration.

Edit Connection

To edit a connection and change its parameters, an administrator clicks on the *Edit* button on the *Connections* screen (shown in Figure 10). This causes the *Edit Connections* pop-up window to appear as shown in Figure 12.

Figure 12 - Edit Connections Pop-up window

The fields are the same as defined on page 35. The administrator changes required fields and clicks *Save* to have them take effect or *Cancel* to discard any changes.

Remove Connection

To remove or delete a connection, an administrator highlights a connection in the list and then clicks on the *Remove* button on the Connections screen (shown in Figure 10). This causes the Remove Connection pop-up window to appear where a user confirms the removal or cancels the attempt.

Managing Users

Users are defined in the InvisaPC system to provide rights to manage the system, rights to connect to different target devices and set parameters for connections. There are three types of users that can be created in an InvisaPC system.

1. *Administrator* – users of the class have full rights to configure the system. They can create/modify/delete new users and connection, change network settings, etc..
2. *Power User* – users of this class can modify resolution for connections to virtual desktops and change his/her local password
3. *Standard Users* – users of this class can only select from a list of pre-defined connections to access and view system information. They cannot change any configuration settings.

The InvisaPC Receiver has one default user – Admin, which is a member of the administrator group. This user is defined by default and cannot be deleted. An InvisaPC Receiver can have a maximum of 32 users defined.

To manage users, an administrator selects the Users tab (this Tab is only visible to Administrator class users). The Users screen is shown as illustrated in Figure 13.
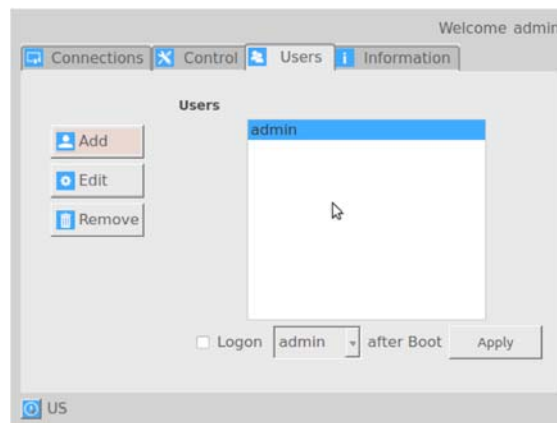

Figure 13 - Users Screens

Add a User

To add a user, the add button is clicked. This causes the New-User window (shown in Figure 14) to be displayed.
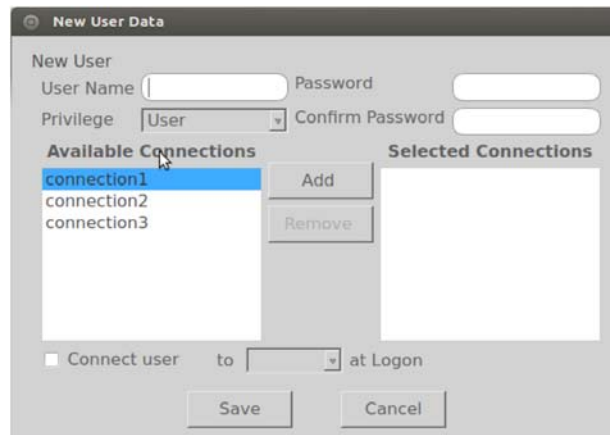
Figure 14 - New User Window

When adding a new user, the following fields are applied:

∞**User Name:** This is a unique name that uses 1–32 characters. The username can be any valid username for a Microsoft O/S. This means the username cannot contain " "/ \ [ ] : ; | = , + * ? < > `'

∞**Password:** This field can be a minimum of 0 characters (i.e. blank) and a maximum of 32 characters. The username can be any valid username for a Microsoft O/S. This means the username cannot contain " "/ \ [ ] : ; | = , + * ? < > `'

∞**Confirm Password:** This field must match the Password field. If there is a mismatch, a message is presented to the user in a pop-up screen.

∞**Privilege:** This field, which is a drop-down list, defines the type of user the new user will be – *Administrator*, *Power-User,* or *User*.

∞**Selected Connections:** The new user must be allocated Connections that he/she can access. These are selected from the Available Connections window by the user selecting a set of connections (click on the connection in the Available Connection window and then click the "Add" button). This causes the selected connections to be "added" to a user's selected connection window.

∞**Connect to at login:** This tick box defines whether the InvisaPC Receiver attempts to connect immediately to the selected connection after a logon by the user. This automatic connection only occurs after a logon. If a user exits the connection, the connection tab is displayed to the user for selection of a connection.

This *Connect to at Login* is only saved when the *Apply* button is clicked. If not clicked and another tab is selected, the changes are ignored.

If not ticked, no automatic connection is made on log-in.

Once the new user fields have been filled out, the *Save* button must be clicked to create the new user. Clicking the *Save* button causes the validation of the new username checking that it is unique and that the two password entries match. If this validation fails, a pop-up window displays the reason for the failure – and the new user is not created. After dismissing the pop-up window, the user can fix the error and click *Save* again.

The *Cancel* button should be clicked if the new user is not to be created.

Edit a User

To edit a user, click on the *Edit* button. This causes the Edit-User window (shown in Figure 15) to be displayed.
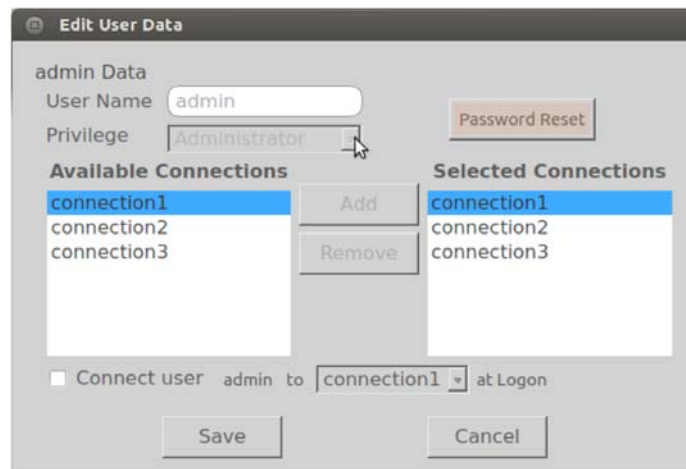

Figure 15 - Edit User Window

This window allows the user privilege type, the permitted connections available, the password, and the auto-connect option to be changed.

The default "admin" account gets access to all connections; this list cannot be modified. Other administrator-type users can have their connection list modified.

Once the changes have been made for a user, they only become active once the Save button has been clicked. The changes can be abandoned by clicking the *Cancel* button.

Remove a User
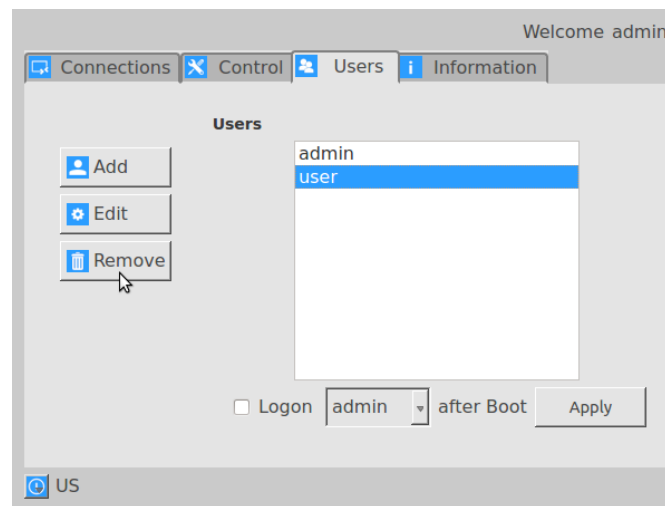To remove a user, highlight the user's name and press "Remove."

Figure 16 - Remove User

When the *Remove* button is clicked, a pop-up window is displayed to prompt confirmation that this user is to be deleted. Click the *Yes* button to remove the user. Clicking the *No* button causes this action to be aborted and the user is not removed.

Note: There must always be a user of the name Admin in the InvisaPC system so the system can always be administrated. When attempting to remove the user, the system checks if the username is Admin before it will allow the user to be removed.

Control Tab

The Control Tab on the OSD provides the ability for an Administrator to change configuration of InvisaPC systems. The Control Tab is shown in Figure 17.
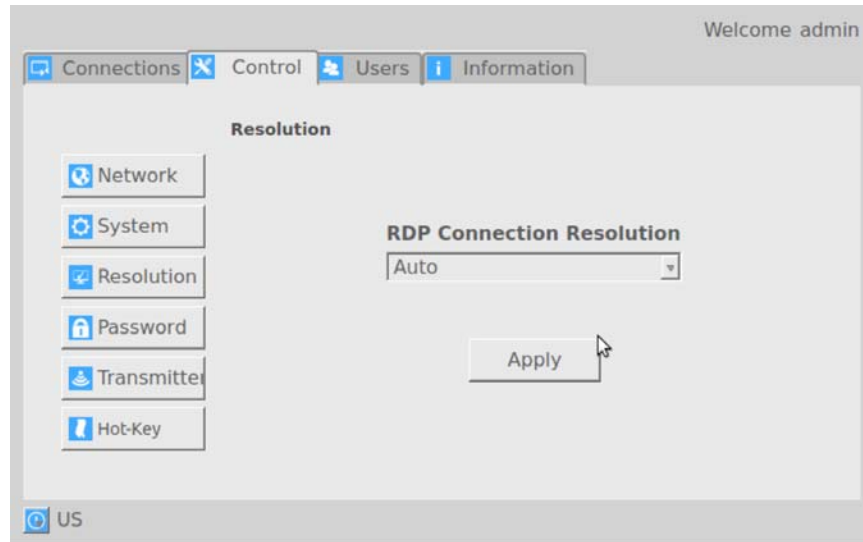

Figure 17 - Control Tab

There are six functions that can be accessed on this tab:

1. Network – allows administrator to change network parameters for the InvisaPC Receiver.
2. System – allows upgrading of unit firmware, reset unit to factory defaults, and to save/restore unit configuration to a USB drive.
3. Resolution – allows change of preferred resolution for an RDP connection. This setting has no effect when connecting to an InvisaPC Transmitter.
4. Password – change the administrator password.
5. Transmitter – allows changing of Transmitter parameters.
6. Hot-Key – allows changing of the active hot-key for keyboard short-cuts.

Network

The network screen shown in Figure 18 allows an administrator to change the settings for the InvisaPC Receiver. The default network setting for the Receiver is a static IP address of 192.168.1.21. If DHCP is selected, the receiver gets its IP address from the DHCP server. The *Apply* button must be clicked to confirm any changes to network settings.

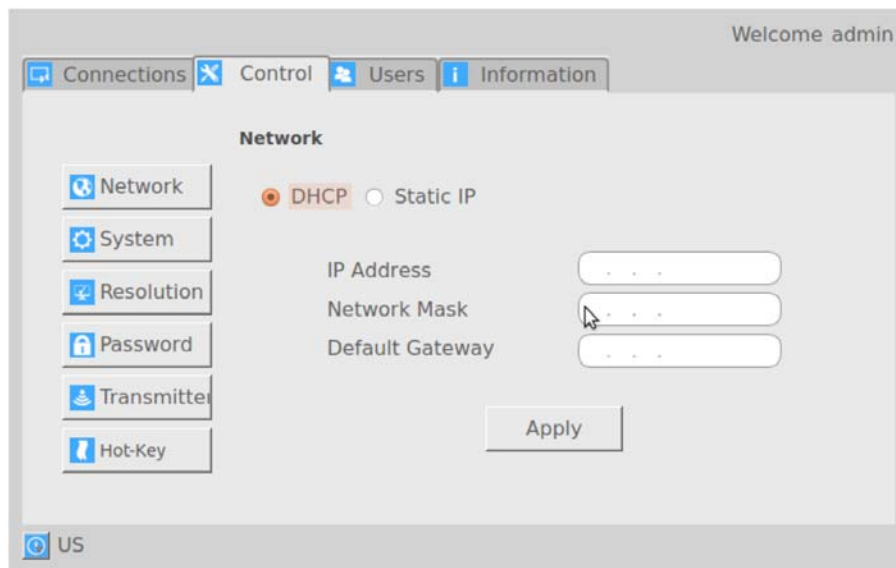**Note**: Only IP V4 addressing supported in version 1.x.

Figure 18 - Network Settings

System

The System screen shown in Figure 19 allows an administrator to upgrade the firmware in the InvisaPC Receiver, reset it to factory defaults, and import/export the configuration to an external USB drive.
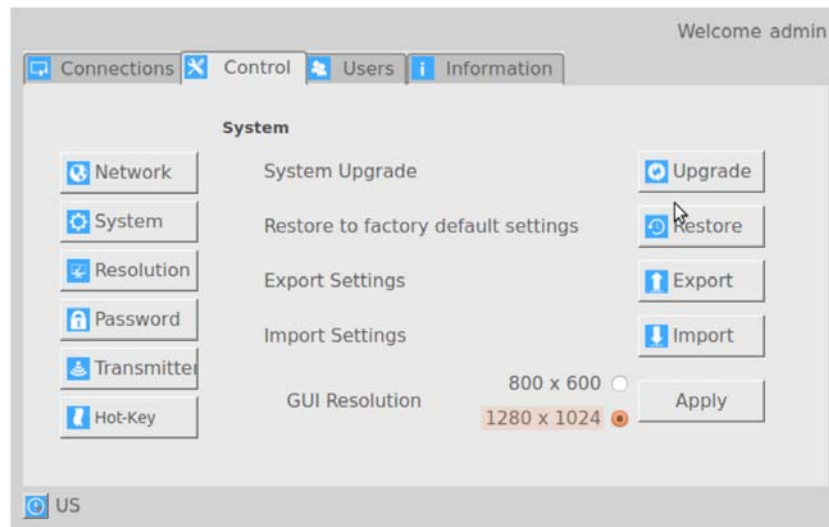

Figure 19 - System Screen

On this screen, the administrator can set the resolution for the OSD. By default this is set at 1280x1024. This can be changed to 800x600. The *Apply* button must be set to save the change.

System Upgrade

The InvisaPC Receiver is upgraded from a USB Flash drive. Simply take the "firmware.clu" file and place it in the root directory of the flash drive. When the *Upgrade* button is clicked the "valid" upgrade files on the USB drive are displayed. A valid file has the extension .clu – an example is shown in Figure 20. If the flash drive isn't recognized, try to format the drive using fat 32.
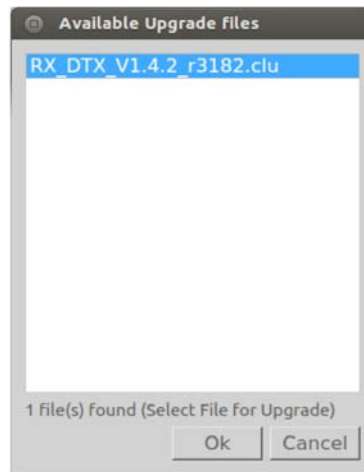
Figure 20 - Upgrade Files

Once the administrator has selected the file and clicked *Ok*, the system checks that the selected file has no errors prior to upgrading the InvisaPC Receiver. The configuration of the unit is preserved through the upgrade.

Resolution

The Resolution screen allows the resolution to be changed for an RDP connection i.e. defines the resolution that the virtual desktop will be accessed with. This setting can only be changed by *Administrators* and *Power-Users*.

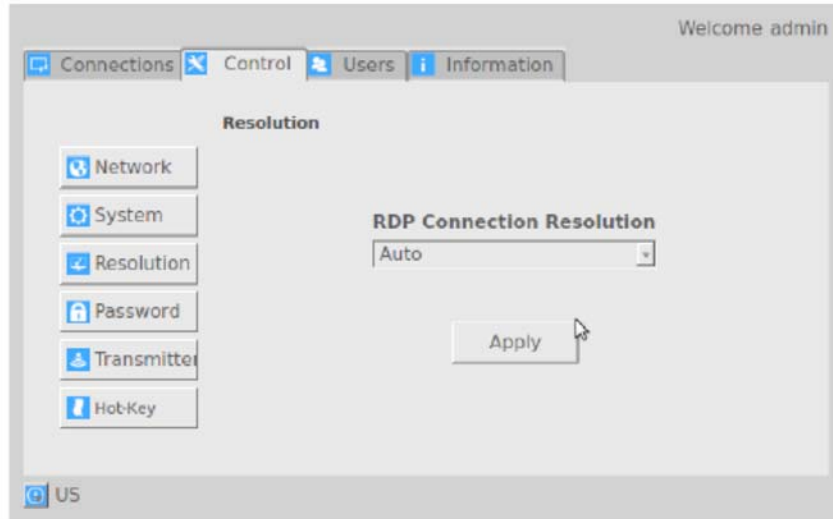This setting has no effect on InvisaPC Tx connections.

Figure 21 - Resolution Screen

Password

The *Password* button when clicked allows the current user's password to be changed. This button is only visible to Administrators and Power-Users.

Transmitter Configuration

The *Transmitter* button on the Control Tab allows administrators to change the configuration of an InvisaPC Transmitter (this button is not visible to Power-users and Standard-Users). The following options are available when the *Transmitter* button has been activated:

1.Transmitter Information
2.Transmitter firmware upgrade
3.Transmitter restore factory defaults
4.Transmitter re-boot
5.Transmitter discovery
6.Discover Transmitter IP address

Configuring a Transmitter

To configure a Transmitter, the IP address must be defined for the target Transmitter. This is called setting an active Transmitter IP address. When there is no active IP address defined, the TX Setting window has all the buttons greyed out except for the *Apply* and *Discover* buttons as shown in Figure 22.
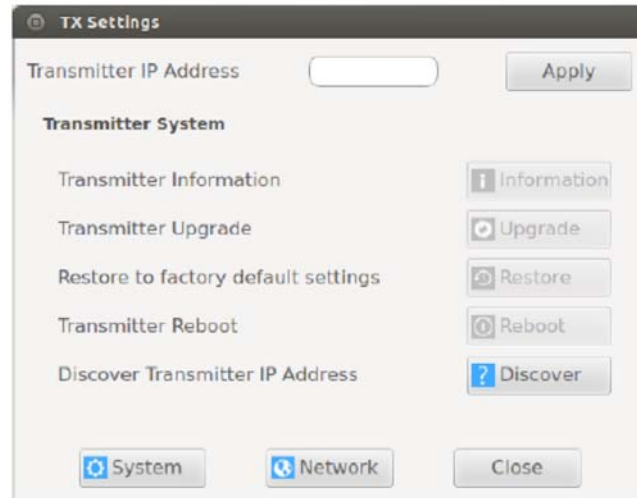

Figure 22 – Transmitter Settings Configuration Window - no active IP address

There are two ways to define an active IP address. One is to enter the Transmitter's IP address directly and click the *Apply* button. This only causes a check that the IP address is valid and not that we can communicate with this transmitter (or that the device at that IP address is a transmitter).

If a valid IP address is entered, the TX Setting window makes all the options available for the administrator as shown in Figure 23.

A second mechanism to define an active Transmitter IP address is to use the discovery process. This requires the transmitter to be connected to the receiver on a point-to-point link or be the only transmitter on the attached network. If this is the case, the administrator can click on the *Discover* button and follow the wizard to discover the IP address of the attached Transmitter. This is required in the case when an administrator does not know the IP address of the Transmitter.
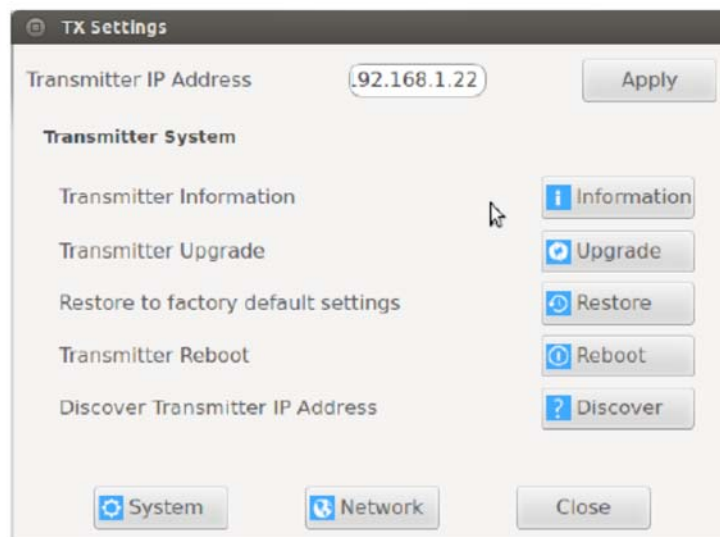
Figure 23 - Transmitter Settings Configuration Window - Active IP address

If the IP address of the Receiver and Transmitter are not on the same subnet, a router is required to allow them to communicate. This is true even when the Receiver "discovers" the Transmitter's IP address. One way to avoid this is to change the Receiver address to be on the same subnet as the Transmitter, make the required configuration changes to the Transmitter, and then change the Receiver back to its required IP address.

Transmitter Information

The *Information* button provides transmitter related information such as Device Model, Serial Number, MAC address, and current Firmware Version to the administrator.

If the active IP address is not the address of a valid InvisaPC Transmitter or this address is unreachable, an error message is returned.

Transmitter Upgrade

The administrator can click the *Upgrade* button to change the firmware on a transmitter. The upgrade file is selected from the set of files on an attached USB drive. These files will have the extension .clu . The selected file is checked to be a valid transmitter upgrade file prior to starting the upgrade. The OSD will provide a series of screens to walk the user through the process.

The upgrade can take several minutes to complete and the power to the Transmitter and the Receiver **must not** be disconnected during the upgrade. During the upgrade process the Transmitter may re-boot a couple of times.

If the active IP address is not the address of a valid InvisaPC Transmitter or this address is unreachable, an error message is returned.

Transmitter Restore Factory Defaults

The administrator can click the *Restore* button to reset the transmitter back to factory defaults. See page 56 for InvisaPC Transmitter factory defaults.

If the active IP address is not the address of a valid InvisaPC Transmitter or this address is unreachable, an error message is returned.

Transmitter Re-boot

The administrator can click the *Reboot* button to power-cycle the transmitter.

If the active IP address is not the address of a valid InvisaPC Transmitter or this address is unreachable, an error message is returned.

Transmitter Network Settings

The administrator can click the *Network* button to cause the Transmitter Network Settings window to be displayed as shown in Figure 24. This example figure has no active IP address defined. If previously defined, it is maintained when bringing up this window.

Optionally the administrator can choose to target a different transmitter by entering a new Transmitter IP Address and clicking the *Apply* button.

To change the IP address settings for a Transmitter at the active IP address, the administrator can enter the new IP address, subnet mask, and gateway and then click on the *Apply* button. This may cause the Transmitter to power-cycle itself. During this time, the transmitter will not respond for almost a minute.
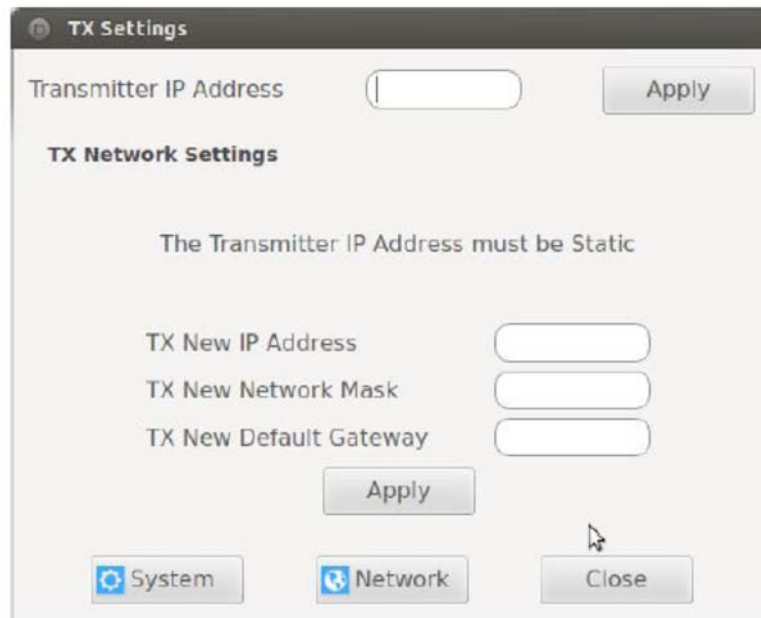

Figure 24 - Transmitter Network Settings Window

If the new IP address for the InvisaPC Transmitter is on a different subnet to the Receiver, the Receiver will not be able to communicate with it without going through a router. This is even the case on a point-to-point link between the Transmitter and Receiver.

If the active IP address is not the address of a valid InvisaPC Transmitter or this address is unreachable, an error message is returned.

Hot-key

The Hot-Key button allows the administrator to change the hot-key configuration. The hot-key is used with the "o" key to bring up the OSD when a connection is active. The hot-key with "p" key is used to switch to a previous active connection.
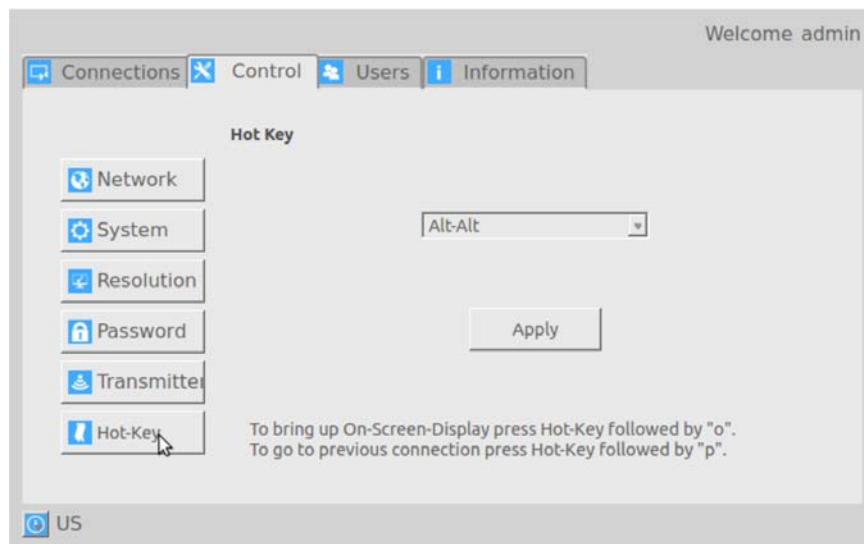
Example: PrtScrn, O (default)

Figure 25 - Hot-key definition

The default hot-key is *Print-Screen* (PrntScrn). The alternatives are shown in table 3.2. The Apply button must be clicked to confirm a change of hot-key.

Table 3.2: OSD Hotkey Sequences

Hotkey Sequences

Print Screen (Default)	- press PrnScrn key
Ctrl + Ctrl	- press Ctrl key twice within 1 sec
Alt + Alt	- press Alt key twice within 1 sec
Shift + Shift	- press Shift key twice within 1 sec

Open OSD: "Hotkey" O

Switch to previous target: "Hotkey" P

Appendix

A

Appendix A- Factory Defaults

This appendix defines the settings for various parameters for InvisaPC Receivers and Transmitters when they ship from the factory or when an administrator requests a reset to factory defaults.

InvisaPC Receiver Defaults

Network Settings Defaults

∞IP address configuration (Static or DHCP): Static
∞IP Address: 192.168.1.21
∞Default Gateway: 0.0.0.0
∞Default Subnet Mask: 255.255.255.0

Connection Defaults

∞Name: Default Tx
∞Connection Address: 192.168.1.22
∞Username: none
∞Password: none
∞Port: 3389
∞Transmitter Connection: Enabled
∞Audio: Disabled
∞USB Redirection: Disabled
∞Username: none
∞Password: none

Hot-key Default

∞Active Hot-key: Print-Screen (PrntScrn)

Connection Modes

∞Auto-Login: Admin (login in as Admin)
∞Auto-Connect: not enabled
∞Connection Type: Private

InvisaPC Transmitter Defaults

Network Settings Defaults

∞IP address configuration (Static or DHCP): Static
∞IP Address: 192.168.1.22
∞Default Gateway: 0.0.0.0
∞Default Subnet Mask: 255.255.255.0

Discovering a Transmitter:

If the transmitter IP address is lost or needs to be configured, you can perform the following steps to discover the transmitter.

1. Connect the transmitter and receiver together using a straight CATx cable.
2. Power down the transmitter, but leave the receiver in the ON state.
3. Connect a keyboard, monitor, and mouse to the receiver and login as "admin."
4. Navigate to (Control)>>(Transmitter)>>(Discover) and follow the on-screen prompts.
5. You will be prompted to connect the devices together, in the second step, power up the transmitter.
6. Once discovered, you can use the IP address of the transmitter to reconfigure it.

Lost Admin Password:

The InvisaPC solution will allow for more than one administrator account to be configured as a secondary means of adminstration. If you lose the administrator account password, there is no way to retrieve or reset the password. The unit will need to be returned.

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